

Food *and* Fuel

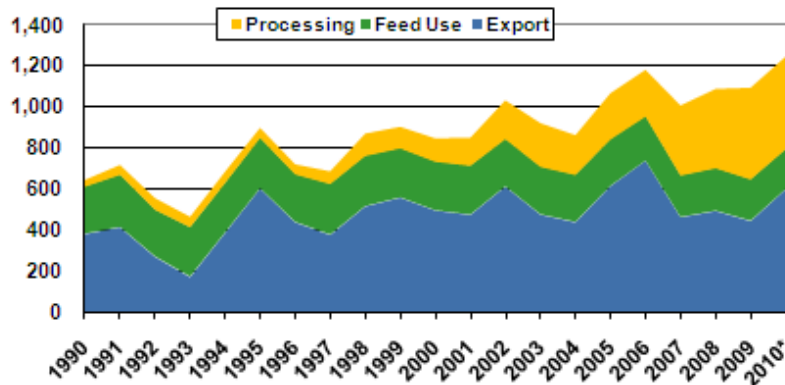
Minnesota is home to 21 ethanol plants and 4 biodiesel plants with a combined production capacity of more than 1 billion gallons of homegrown, renewable fuels. Minnesota's robust biofuels industry has allowed the state to reduce dependence on foreign energy sources while improving its environmental profile and adding value to the state's economy.

Q: Have biofuels reduced the amount of corn available for food supplies?

A: Somewhat—but increasing yields and other technological improvements have generally allowed other uses for corn to be maintained.

The use of corn for ethanol has an incremental impact on the supply of corn. However, corn supplies domestically and exports of corn internationally have generally remained steady despite rising ethanol production. According to analyses by the Minnesota Department of Agriculture, the amount of corn used for ethanol production in the state increased from 29% in 2009 to 34% in 2010, while corn exports and corn for feed were virtually unchanged.¹

Minnesota Corn Utilization Trend, 1990-2010



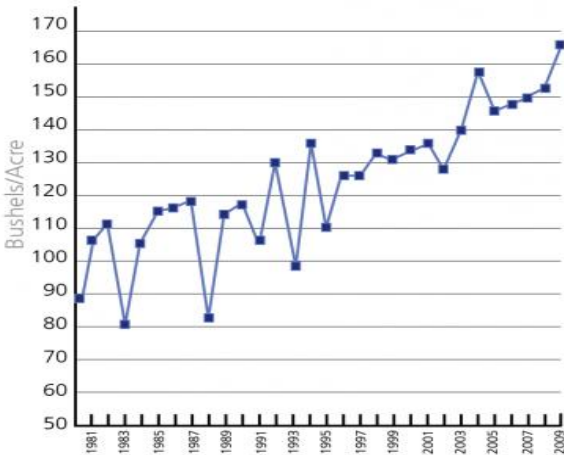
* Projected

Source: Minnesota Department of Agriculture, Pro Exporter Network

¹ The supply and demand for corn and soybeans can vary based on global weather events, increased consumption in developing countries, the value of the dollar and activity in the commodity markets. Considerable fluctuation and instability also occurs in crude oil markets, which are subject to a wide range of monetary, political, marketing and military events around the globe.

The amount of corn available for all uses has been growing in the United States due to technological advances that have steadily increased corn yields. In 1950, one acre of corn yielded an average of 40 bushels; in 2009 that number had increased to more than 160 bushels per acre with projections of 180 bushels per acre by 2015 and as high as 300 bushels per acre by 2030.² Yield growth alone can provide the additional corn needed to continue increasing U.S. ethanol production.

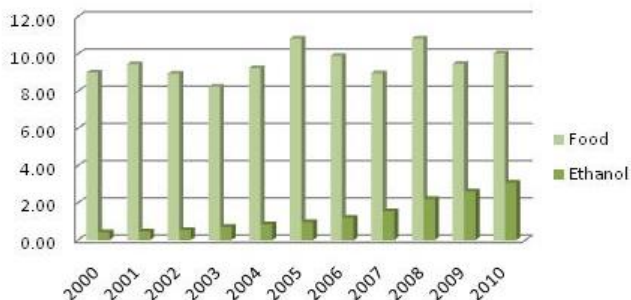
U.S. Average Corn Yield, 1980-2009



Source: Renewable Fuels Association/USDA

Corn production has also reached record levels in recent years—2009 saw corn harvests at more than 13 billion bushels.³ From 1977 to 2007, the size of the U.S. corn crop doubled while acreage only expanded by 11%.⁴ Soybeans, the main feedstock for U.S. biodiesel, also set production records in 2009 at 3.3 billion bushels.⁵ Although USDA projections for 2010 are somewhat lower for both crops, the general trend is expected to continue increasing.

U.S. Corn Use for Food and Ethanol (billion bushels)



Source: American Coalition for Ethanol

² Growth Energy, 2010

³ USDA, 2010 Crop Production Report

⁴ Renewable Fuels Association, 2010

⁵ USDA, 2010 Crop Production Report

Moreover, new technology in ethanol production means that a gallon of ethanol can be produced from fewer bushels of corn. Today, one bushel of corn yields about three gallons of ethanol, compared to about 2.5 gallons a few years ago. According to the Renewable Fuels Association, ethanol yields per bushel of corn increased by 7% in the five years preceding 2009.

Q: What factors contribute to the rising cost of food?

A: According to the World Bank and others, a primary contributor to food price increases has been higher oil prices.

Biofuels are one of the many factors impacting the price of corn—but it is not the main cause of corn and other food price increases. According to numerous recent reports, the food price spikes of 2007-08 were principally caused by factors unrelated to biofuels production:

- The World Bank reported in 2010 that rising energy costs were the dominant influence on commodity prices; speculation in the commodities markets may have played a significant role as well. The report also argues that the impact of biofuels on food prices has been overstated.⁶
- The International Food Policy Research Institute cites a strong link between rising oil prices and commodity price escalation.⁷ This is because higher oil prices translate into higher fuel prices that impact the cost of farming agricultural lands. Fertilizer and transportation prices are also tied to energy prices—both of which affect commodity prices.
- According to the Congressional Budget Office, from April 2007 to April 2008 the rise in the price of corn resulting from expanded production of ethanol contributed between 0.5 and 0.8 percentage points of the 5.1% increase in food prices.
- In 2008, the White House Council of Economic Advisors found that ethanol contributed to 0.5% of rising food prices in the United States. They also concluded that ethanol accounts for somewhere between 2% and 3% of the overall increase in global food prices.
- The U.S. Departments of Energy and Agriculture came to similar conclusions, citing biofuels as contributing 4% to 5% of global food price increases.

⁶ World Bank Development Prospects Group, *Placing the 2006/08 Commodity Price Boom into Perspective*, July 2010

⁷ IFPRI, *Global Food Crisis*, 2010



In the second half of 2008, ethanol production continued to rise while corn prices fell by almost half—but retail food prices remained steady, providing further evidence that biofuels were not a significant factor in food price trends.

Q: What is the impact of corn prices on actual retail food costs?

A: Less significant than most people think.

Supply and demand largely determine the price of food items, with labor and energy costs having the most significant impact. According to the U.S. Department of Agriculture, labor costs account for 38 cents of every dollar a consumer spends on food; packaging, transportation, energy, advertising and profits account for 24 cents. About 19 cents of every consumer dollar can be attributed to the actual price of food inputs.

As an example, a standard box of corn flakes contains approximately 10 ounces of corn, or about 1/90th of a bushel. If corn is priced at \$5.50 per bushel, a box of corn flakes contains 6 cents worth of corn—or about 1% of the total product cost.⁸

Q: How have biofuels impacted feed supplies and costs for livestock and other sectors?

A: A by-product of the ethanol production process contributes to the feed supply, thereby lowering prices for livestock and other producers.

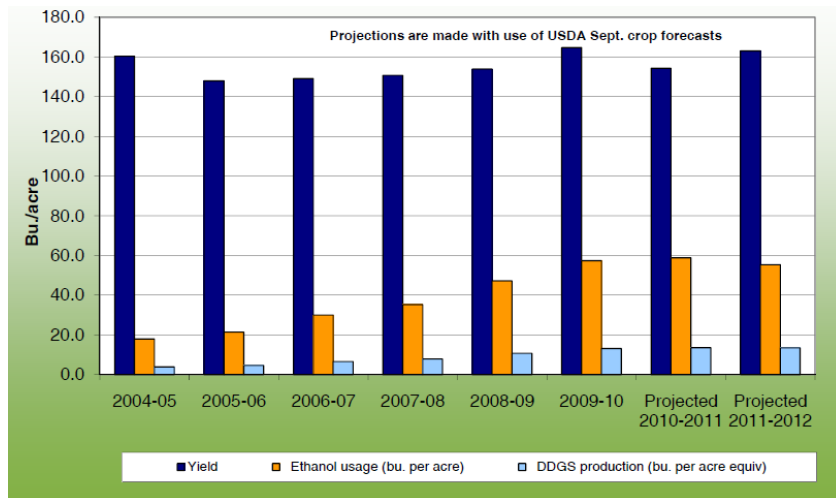
Ethanol only uses the starch portion of the corn crop. One-third of every bushel of corn processed into ethanol is returned as high protein livestock feed—such as distillers grains, which contain about three times the amount of protein as corn.

In 2010-11, the USDA estimates that approximately 4.9 billion bushels of corn will be used for U.S. ethanol production, or about 40% of the crop—but factoring in the displacement of feed with distillers grains would bring net feed usage closer to under 4 billion bushels, or less than 30% of corn harvested. It is projected that the U.S. ethanol industry will generate nearly 41 million tons of high-quality feed for beef cattle, dairy cows, swine and poultry in 2010-11—up from 27 million tons in 2008—making the renewable fuels sector one of the larger feed processing segments in the United States.⁹

⁸ USDA Economic Research Service, 2008; Renewable Fuels Association, 2010.

⁹ Agricultural Marketing Resource Center/Iowa State, 2010

Total Yield, Bushels used for Ethanol and Returned as Dried Distillers Grains



Source: Agricultural Marketing Resource Center

The United States also exports large amounts of distillers grains annually—in 2009-10, more than 8 million tons were shipped to various world markets including Mexico, Canada, and Turkey, among others.¹⁰

Q: Is the production of biofuels harming the world's poor?

A: No—in fact, it has just the opposite effect.

According to the United Nation's Food and Agriculture Organization, the most likely causes of hunger are a lack of infrastructure and access to capital—not food scarcity. Policymakers have suggested that incorporating more advanced agricultural practices and technologies into the crop production industries of developing countries is more productive than emergency response-based food assistance.

A 2010 report by the International Food Policy Research Institute report characterizes this fundamental part of the solution, as follows: "Despite obstacles, sustained and smart investments in developing country agriculture will be essential if the world food system is to finally deliver what it ought to: greater food security and real income gains for the world's poorest people."¹¹

On a global scale, U.S. ethanol production is projected to consume less than 10% of the coarse grains supply. Coarse grains are primarily used to feed animals, not humans directly. Biofuels also displace petroleum use, thereby expanding the world oil supply and keeping energy prices lower across the globe. In 2010, the projected production and use of about 13 billion gallons of

¹⁰ USDA Economic Research Service

¹¹ IFPRI, *Global Food Crisis*, 2010



ethanol would displace the need for 484 million barrels of oil, at a savings of more than \$37 billion.¹²

Q: Will sufficient corn be available for all uses in future years?

A: Stocks of corn available for future use are currently very tight—but increasing crop yields and other technological advances, as well as hedging against oil markets, can help modify the impact.

For 2010-2011, the USDA projects the corn stocks-to-use ratio to be the lowest in 15 years (at 675 million bushels, or about 5%). Increased corn use for ethanol has contributed to this tightening—but other factors such as strong U.S. and world crop demand, crop failures in some countries and higher exports of coarse grains also play an important role. In addition, the use of corn for food, seed, and industrial use is projected to be higher due to rising exports of corn-based sweeteners.

The USDA has predicted that corn stocks will remain tight into 2012—but farmers will likely respond to higher prices by increased plantings next season. Risk and price volatility in food markets is matched by significant risk factors affecting petroleum and other energy markets. These factors are impacted by fluctuations in supply demand as well as political and environmental events around the world. Since energy markets also have a considerable impact on food costs, there is a complex relationship between energy and food that creates a situation where additional ethanol production and/or higher corn yields can be a hedge against volatility in crude oil and gasoline prices.

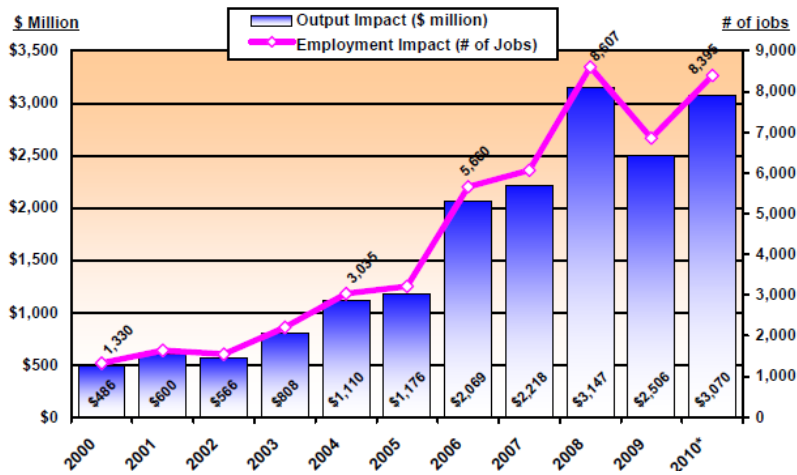
Q: Why has Minnesota invested so much to build a biofuels industry?

A: Minnesota's ethanol and biodiesel industries have provided significant benefits to the state's economy, energy security and environmental profile.

Based on the production of 1.1 billion gallons of ethanol in 2010, the Minnesota Department of Agriculture estimates that the industry generated \$3.1 billion in economic return and nearly 8,400 jobs. The soy diesel industry has contributed approximately \$928 million and more than 5,600 jobs based on annual production levels of 60 million gallons.

¹² Renewable Fuels Association and LECC, 2010

Economic Impact of Minnesota's Ethanol Industry



*projected

Source: Minnesota Department of Agriculture

Minnesota's biofuels sector also helps to decrease reliance on foreign sources of energy through the use of homegrown fuels. Minnesota produces more than enough ethanol and biodiesel to meet state consumption level—in fact, more than 70% of the ethanol produced in 2009 was exported to other states.

In addition to these impacts, Minnesota's biofuels industry contributes to cleaner air through the blending of 10% ethanol into all gasoline. The Twin Cities Area has achieved and maintained "attainment status" with EPA's carbon monoxide standard; the continued use of ethanol helps to keep emissions low.